
Updating the O*NET®-SOC Taxonomy: Incorporating the 2018 SOC Structure - Summary and Implementation

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Executive Summary

The revision of the O*NET®-SOC (Occupational Information Network-Standard Occupational Classification) occupational taxonomy is part of the O*NET program's continuous improvement effort. The main goal of the revision is to align the O*NET-SOC taxonomy with the 2018 SOC (Office of Management and Budget, 2018). This document provides a summary of the taxonomy revision process and describes the implementation of resulting changes. The current O*NET-SOC taxonomy, O*NET-SOC 2010, is to be replaced by the revised taxonomy, O*NET-SOC 2019. For additional taxonomy information, including crosswalks and listings, see O*NET Resource Center—The O*NET-SOC Taxonomy (<https://www.onetcenter.org/taxonomy.html>).

The O*NET-SOC 2019 taxonomy is compatible with changes made to the SOC structure reflected in the 2018 SOC. Aligning these taxonomies enables the O*NET system to take advantage of important SOC-based information collected by other government and private organizations. After the release of the 2018 SOC, the O*NET-SOC taxonomy was reviewed for compatibility and appropriate modifications were made, such as nesting detailed O*NET-SOC occupations under appropriate 2018 SOC occupations. These changes to the O*NET-SOC taxonomy, based on the conversion to the 2018 SOC taxonomy, are outlined in this paper.

The O*NET-SOC 2019 taxonomy includes 1,016 occupational titles, 923 of which represent O*NET data-level occupations. Data-level occupations are those for which the O*NET program collects data from job incumbents, occupation experts, occupational analysts, employer job postings, and customer/professional association input. Data are collected on a wide variety of variables and scales related to occupational characteristics and worker requirements drawn from the O*NET Content Model (<https://www.onetcenter.org/content.html>). The O*NET-SOC 2010 taxonomy contained 1,110 occupational titles, 974 of which represented O*NET data-level occupations (National Center for O*NET Development, 2010).

Thirteen O*NET-SOC detailed, more specific breakout occupations from the O*NET-SOC 2010 taxonomy were added into the 2018 SOC. Additionally, the new O*NET-SOC 2019 taxonomy adds 12 new detailed O*NET-SOC occupations, including four new and emerging (N&E) occupations related to cybersecurity. N&E occupations reflect occupations that involve work significantly different from that performed by job incumbents of other occupations and occupations that are not fully reflected by the existing SOC and prior O*NET-SOC structure.

The scheduled August 2019 release of the O*NET-SOC 2019 taxonomy represents the fifth taxonomy modification since the initial release of the O*NET database in 1998. A summary of previous modifications is presented below:

- First Modification: O*NET-OU 1998 to O*NET-SOC 2000 (OES-based conversion to SOC-based conversion)
- Second Modification: O*NET-SOC 2006 (focus on data specificity)
- Third Modification: O*NET-SOC 2009 (addition of 153 N&E occupations)
- Fourth Modification: O*NET-SOC 2010 (adoption of 2010 SOC taxonomy)
- Fifth Modification: O*NET-SOC 2019 (adoption of 2018 SOC taxonomy)

The O*NET-SOC 2019 taxonomy will incorporate the taxonomy revisions described in this paper, which include alignment of codes, titles, and definitions with the 2018 SOC and the addition of 12 new detailed O*NET-SOC occupations. As a result of the revisions, the O*NET database and O*NET products will be better able to meet the needs of customers by providing easy movement between the O*NET system and other SOC-based data resources. In addition, customers will have continued access to occupational information for N&E occupations.

It is important to note that the O*NET-SOC taxonomy is a continuous improvement effort. The changing world of work will require ongoing research efforts to ensure an up-to-date taxonomy. Working closely with the U.S. Department of Labor, Employment & Training Administration (U.S. DOL, ETA), the National Center for O*NET Development will monitor and evaluate O*NET-SOC occupations, including N&E occupations, during the course of sampling and data collection and make modifications, additions, and/or removals based on collected O*NET data.

The O*NET system was designed to adapt to changes in the world of work. With the alignment of the O*NET-SOC 2019 taxonomy to the 2018 SOC, the correspondence between the O*NET system and the world of work strengthens and allows the O*NET Program to continue to meet the needs of its customers.

Introduction

The revision of the O*NET-SOC (Occupational Information Network-Standard Occupational Classification) occupational taxonomy is part of the O*NET program's continuous improvement effort. The O*NET-SOC is based on the Standard Occupational Classification [(SOC); Office of Management and Budget, 2018] system. In some cases, the O*NET-SOC describes occupations at a more detailed level than does the SOC to reflect needed occupational specificity. In the development of the O*NET-SOC 2019 taxonomy, efforts were made to ensure its compatibility with the 2018 SOC. This included incorporating and aligning O*NET codes, definitions, and titles with the 2018 SOC. This document provides a summary of the taxonomy revision process and describes the implementation of the fifth modification to the taxonomy. The O*NET-SOC 2010 taxonomy is being replaced with the revised O*NET-SOC 2019 taxonomy. For additional taxonomy information, including crosswalks and listings, see O*NET Resource Center—The O*NET-SOC Taxonomy (<https://www.onetcenter.org/taxonomy.html>).

The main goal of the revision to the taxonomy is the alignment of the O*NET-SOC taxonomy with the 2018 SOC. O*NET-SOC taxonomy codes, titles, and definitions were aligned with the 2018 SOC to ensure compatibility with the SOC-based system. In addition, newly identified O*NET-SOC occupations were added to the taxonomy, including four new and emerging (N&E) occupations related to the cybersecurity industry. N&E occupations are defined as (a) occupations that involve work significantly different from that performed by job incumbents of other occupations and (b) are not fully reflected or called out by the existing O*NET-SOC structure (National Center for O*NET Development, 2006).

As a result of the revisions to the O*NET-SOC taxonomy, the O*NET database and O*NET products are better able to meet the needs of customers, who will be able to move easily between the O*NET system and other SOC-based data resources.

As a frame of reference, the next section provides more detail about the SOC and O*NET-SOC taxonomy structure.

O*NET-SOC Taxonomy Structure

The Office of Management and Budget (OMB) mandates that all government agencies collect occupation-related information via a classification compatible with the SOC. From a customer perspective, this allows movement across various information systems or data products with greater ease, while facilitating the integration of different types of information within systems. Changes made to the O*NET-SOC 2019 taxonomy ensured the O*NET-SOC taxonomy not only represents the SOC structure, but reflects changes occurring in the world of work due to changes in technologies, business practices, and the organization of work.

The structure of the 2018 SOC system includes four levels of aggregation: 23 major groups, 98 minor groups, 459 broad occupations and 867 detailed occupations. All SOC occupations are assigned a six-digit code. The first and second digits represent the major group; the third digit represents the minor group; the fourth and fifth digits represent the broad occupation; and the sixth digit represents the detailed occupation. The 23 major groups of the SOC include:

- 11-0000 Management Occupations
- 13-0000 Business and Financial Operations Occupations
- 15-0000 Computer and Mathematical Occupations
- 17-0000 Architecture and Engineering Occupations
- 19-0000 Life, Physical, and Social Science Occupations
- 21-0000 Community and Social Service Occupations
- 23-0000 Legal Occupations
- 25-0000 Educational Instruction and Library Occupations
- 27-0000 Arts, Design, Entertainment, Sports, and Media Occupations
- 29-0000 Healthcare Practitioners and Technical Occupations
- 31-0000 Healthcare Support Occupations
- 33-0000 Protective Service Occupations
- 35-0000 Food Preparation and Serving Related Occupations
- 37-0000 Building and Grounds Cleaning and Maintenance Occupations
- 39-0000 Personal Care and Service Occupations
- 41-0000 Sales and Related Occupations
- 43-0000 Office and Administrative Support Occupations
- 45-0000 Farming, Fishing, and Forestry Occupations
- 47-0000 Construction and Extraction Occupations
- 49-0000 Installation, Maintenance, and Repair Occupations
- 51-0000 Production Occupations
- 53-0000 Transportation and Material Moving Occupations
- 55-0000 Military Specific Occupations

SOC minor groups, broad occupations, and detailed occupations are assigned codes related to the corresponding major groups. For example:

- 17-0000 Architecture and Engineering Occupations (SOC major group)
- 17-2000 Engineers (SOC minor group)
- 17-2110 Industrial Engineers, Including Health and Safety (SOC broad occupation)
- 17-2112 Industrial Engineers (SOC detailed occupation)

In the O*NET-SOC taxonomy, an occupation that is directly adopted from the SOC system is assigned the six-digit SOC code, along with a .00 extension. If directly adopted from the SOC, the SOC title and definition are also used. Hereafter, these are referred to as SOC-level occupations.

In cases where the O*NET-SOC occupation is more detailed than the original SOC detailed occupation, it is assigned the six-digit SOC code from which it originated, along with a two-digit extension starting with .01, then .02, .03 and so on, depending on the number of detailed O*NET-SOC occupations linked to the particular SOC detailed occupation.

For example, Industrial Engineers is a SOC detailed occupation to which two detailed O*NET-SOC occupations are linked. See the occupational codes and titles for this example below.

- 17-2112.00 Industrial Engineers (SOC-level)
- 17-2112.01 Human Factors Engineers and Ergonomists (detailed O*NET-SOC occupation)
- 17-2112.02 Validation Engineers (detailed O*NET-SOC occupation)
- 17-2112.03 Manufacturing Engineers (detailed O*NET-SOC occupation)

All three occupations, 17-2112.01 Human Factors Engineers and Ergonomists, 17-2112.02 Validation Engineers, and 17-2112.03 Manufacturing Engineers, are data-level occupations in the O*NET-SOC taxonomy. Data-level occupations are those for which the O*NET program collects data from job incumbents, occupational experts, and occupational analysts on a wide variety of variables and scales, such as occupational characteristics and worker requirements drawn from the O*NET Content Model (<https://www.onetcenter.org/content.html>).

In the example above, the SOC-level occupation, 17-2112.00 Industrial Engineers, and the three detailed O*NET-SOC occupations, 17-2112.01 Human Factors Engineers and Ergonomists, 17-2112.02 Validation Engineers, and 17-2112.03 Manufacturing Engineers, are all data-level occupations. That is, we collect at both the SOC-level and the detailed O*NET-SOC level, adding occupations that provide more specificity than the SOC.

O*NET-SOC 2019 Taxonomy

The major goal of revising the O*NET-SOC 2010 taxonomy is to reflect changes made to codes, titles, and definitions in the 2018 SOC. Additionally, to keep up with the changing nature of work, newly identified N&E occupations were added to the taxonomy. It is important to note that the O*NET-SOC taxonomy is a continuous improvement effort. The changing world of work will require ongoing research efforts to ensure an up-to-date taxonomy. Working closely with the U.S. Department of Labor, Employment & Training Administration (U.S. DOL, ETA), the National Center for O*NET Development will monitor and evaluate occupations during the course of sampling and data collection and make modifications, additions, and/or removals based on collected O*NET data. To view the entire O*NET-SOC 2019 taxonomy, see Appendix A.

Several general types of changes to the O*NET-SOC taxonomy were possible as a result of changes made to the SOC taxonomy.

- A total of one hundred and fifty seven (157) occupations were removed from the O*NET-SOC taxonomy.
 - Thirty-seven (37) SOC-level occupations were removed due to the 2018 SOC aggregating several occupations into one occupation, breaking out occupations into two or more occupations, or adding more detailed occupations to the taxonomy in place of residual “All Other” occupations (see Appendix B, Type 1).
 - One hundred and twenty (120) detailed O*NET-SOC occupations were removed from the taxonomy due to aggregation of detailed occupations with SOC-level occupations, removal of SOC-level occupations, or addition or removal of a portion of a detailed occupation by the 2018 SOC (see Appendix B, Type 2).
- A total of sixty-three (63) occupations were added to the taxonomy.
 - Fifty-one (51) SOC-level occupations were added by aggregating several 2010 SOC occupations, breaking out 2010 SOC occupations into two or more occupations, or incorporating brand-new occupations (see Appendix B, Type 3).
 - Twelve (12) detailed occupations were added to the O*NET-SOC taxonomy through the addition of new N&E occupations or by aggregating occupations removed from the taxonomy into a detailed occupation (see Appendix B, Type 4).
- Thirteen (13) existing detailed O*NET-SOC occupations were added into the 2018 SOC taxonomy (see Appendix B, Type 5).
- Lastly, a number of code, title, and description changes were made based on changes to the 2018 SOC (see Appendix B, Types 6-8).

The O*NET-SOC 2010 taxonomy included 1,110 occupational titles, 974 of which were data-level occupations. As a result of the taxonomy changes in the 2018 SOC structure, the O*NET-SOC 2019 taxonomy includes 1,016 occupational titles, 923 of which are data-level occupations (see Appendix C).

More specifically, the O*NET-SOC 2019 data-level occupations include:

- 149 detailed O*NET-SOC occupations, four of which are cybersecurity N&Es.
- 722 SOC-level occupations without detailed O*NET-SOC occupations nested under them.
- 52 SOC occupations with detailed O*NET-SOC occupations nested under them. In these cases, data is collected at both the SOC-level and the detailed O*NET-SOC level.¹

Table 1 provides a comparison summary of occupational titles from the O*NET-SOC 2010 taxonomy and the O*NET-SOC 2019 taxonomy.

¹ In the future, data will be available for all SOC-level occupations, as well as more detailed O*NET-SOC occupations.

*Table 1. Summary of O*NET-SOC 2010 and the O*NET-SOC 2019 Taxonomies*

2019 O*NET-SOC to 2010 O*NET-SOC Summary Comparison		
SOC Classification	2019	2010
Major Groups	23	23
Minor Groups	98	97
Broad Occupations	459	461
Detailed SOCs	867	840
“All Other” and Military Specific	-93 ⁴	-91 ⁴
Potential O*NET Data Collection Level Occupations	774	749
O*NET-SOC Data Level¹		
SOC level without Detailed O*NET-SOCs	722	667
SOC level with Detailed O*NET-SOCs	52	37
Detailed O*NET-SOCs ²	149 ³	269
Exceptional Cases	0	1
O*NET-SOC Titles with Data	923	974
O*NET-SOC Non Data-Level		
SOC Military specific	19	20
SOC level with Detailed O*NET-SOCs	0	45
SOC “All Other” with Detailed O*NET-SOCs	24	25
SOC “All Other” without Detailed O*NET-SOCs	50	46
O*NET-SOC Titles Only	93	136
TOTAL O*NET-SOC Occupations	1,016	1,110

¹ Legislators (11-1031.00) will not be populated by job incumbent or occupational expert sources. Transportation Security Screeners (33-9093.00), Motion Picture Projectionists (39-3021.00), Paperhangers (47-2142.00), and Explosive Workers, Ordinance Handling Experts, and Blasters (47-5032.00) will not be updated by job incumbent or occupational expert sources.

² 13 2010 O*NET-SOC occupations were added to the 2018 SOC (these are not part of the 149 Detailed O*NET-SOC count).

³ Includes 12 new detailed O*NET-SOC occupations.

⁴ “All Other” and Military Specific occupations are not populated by the O*NET Data Collection Program.

Objectives of the Revision

In summary, by revising the O*NET-SOC taxonomy as described above, several objectives are achieved:

- The sampling of occupations in the O*NET program continues to be efficient and precise, due to the use of SOC-based occupation employment statistics produced by the U.S. Bureau of Labor Statistics and the states.
- The correspondence between the O*NET-SOC and labor market information improved where possible, while the additional level of detail offered for some O*NET-SOC occupations has been maintained where it adds value. O*NET data have an increased correspondence with employment projections and other labor market information used in career exploration and other applications.
- The O*NET-SOC taxonomy and database meet the demand for more extensive occupational information for workforce investment activities.
- In a changing economy, the revised classification more accurately reflects the many occupations found in today's world of work.

The O*NET-SOC 2019 taxonomy will incorporate the changes made to the O*NET-SOC taxonomy as a result of changes in the 2018 SOC and the addition of new occupations. Future updates will include additional N&E occupations found through continuous research efforts and refined occupational listings based on data collection review.

O*NET Data Collection

As shown in Figure 1, the O*NET-SOC 2019 taxonomy contains 1,016 occupational titles, 923 of which represent data-level occupations. The O*NET Data Collection Program is collecting and publishing updated data for these 923 occupations. Of the 923 data-level occupations, 774 are SOC-level occupations (772 are SOC-level occupations adapted directly from the SOC, while 52 are SOC-level occupations adapted directly from the SOC and also contain more detailed O*NET-SOC occupations), and 149 are detailed O*NET-SOC occupations. The remaining 93 are non-data level occupations (occupational titles only): 19 military occupational titles (including military “All Other” titles), 50 SOC residual “All Other” occupational titles, and 24 SOC residual “All Other” occupational titles to which more detailed O*NET-SOCs are linked.

Figure 1. Summary of the O*NET-SOC 2019 Taxonomy

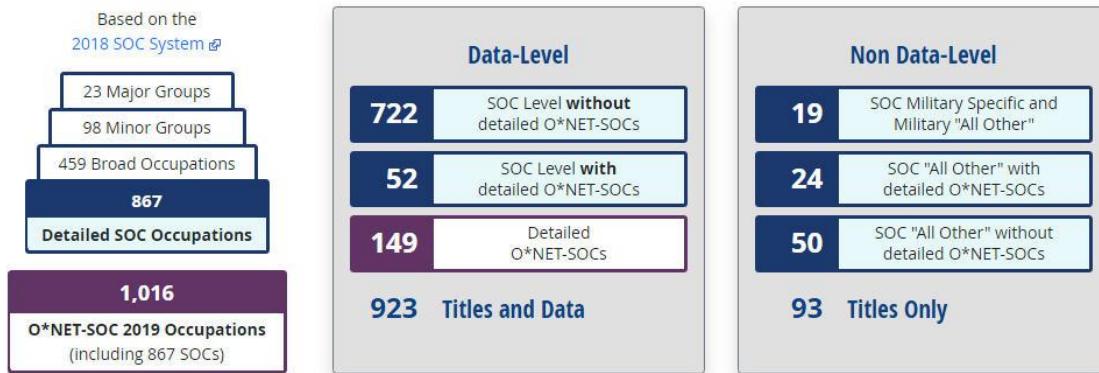


Table 2 provides an overview of the correspondence of the O*NET database releases and the O*NET taxonomy.

Table 2. O*NET Database Release and O*NET Taxonomy

Database Release	Release Date	O*NET Taxonomy
O*NET 98	December 1998	O*NET OU 1998 (OES-based)
O*NET 3.0 – O*NET 9.0	August 2000 – December 2005	O*NET-SOC 2000 (SOC-based)
O*NET 10.0 – O*NET 13.0	June 2006 – June 2008	O*NET-SOC 2006 (SOC-based)
O*NET 14.0 – O*NET 15.0	June 2009 – July 2010	O*NET-SOC 2009 (SOC-based)
O*NET 15.1 – O*NET 25.0	February 2011 – Aug 2020	O*NET-SOC 2010 (SOC-based)
O*NET 25.1 and later	November 2020	O*NET-SOC 2019 (SOC-based)

For additional crosswalks and listings, see O*NET Resource Center—The O*NET-SOC Taxonomy (<https://www.onetcenter.org/taxonomy.html>). For the National Center for O*NET Development’s occupational update summary, see <https://www.onetcenter.org/dataUpdates.html>.

Conclusion

In summary, the revisions to the O*NET-SOC taxonomy offer many improvements to users of the system:

- The changes have increased the efficiency of the data collection effort through increased correspondence to SOC-based occupation employment statistics from the BLS.
- The correspondence between the O*NET-SOC and labor market information has improved where possible, while the additional level of detail offered for some O*NET-SOC occupations has been maintained where it adds value.
- The addition of cybersecurity N&E occupations to be included in data collection meets an immediate need for more extensive occupational information.

This update of the O*NET-SOC taxonomy aligns the taxonomy with the 2018 SOC for continued correspondence with the SOC system. Additionally, with the addition of new N&E occupations, the O*NET system continues to demonstrate its adaptability and accurate reflection of occupations found in the United States. As O*NET data collection continues, N&E occupations will be evaluated and modified as new data is obtained. As the O*NET Program continues to identify N&E occupations, the correspondence between the O*NET system and the world of work promises to grow even stronger.

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